



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/036,638

12/31/2001

Brian C. Smith

066101.0315

5836

31625

7590

04/14/2006

BAKER BOTTS L.L.P.
PATENT DEPARTMENT
98 SAN JACINTO BLVD., SUITE 1500
AUSTIN, TX 78701-4039

EXAMINER

PARK, JUNG H

ART UNIT

PAPER NUMBER

2616

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/036,638

Applicant(s)

SMITH, BRIAN C.

Examiner

Jung Park

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on March 01, 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18, 20 and 21 is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-17 and 22-28 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Mahler et al. (U.S. 6,910,134, "Mahler").

Regarding claim 1, Mahler discloses, "a system for classifying packets based on packet content, the system comprising:

- a sequencer (*processor 104 fig.2*) operable to receive packets (*from 102 fig.2*) and to identify packet flows (*col.5, ln.13-14 where ...identify that particular traffic flow*);
- a content engine (*content processor 110 fig.2*) interfaced with the sequencer to receive packets (*from 104 fig.2*) and to search packet contents (*col.7, ln.12 where ...scanned against a database of known signatures*) for predetermined expressions (*col.7, line 13 where ...known signatures*) in a packet or in a packet flow; and
- a tag map interfaced with the content engine and operable to perform mappings between expressions and subexpressions (*col.8, ln.27-38 where ...compares the significant bits (subexpressions) ...known strings (expressions) that resides in signature memory*) to generate modified tags for (*116 fig.2; col.6, ln.3-18 where it is required to tag packets to assign to one of its quality of service queues; As an example, the method of tagging packets for virus infected data is described in col.10, ln.43-63*) according to the predetermined expressions found by the content engine."

Regarding claim 2, Mahler further discloses, "the sequencer comprises:

- an enqueue engine (*memory 106 fig.2*) operable to read packet flow sequencing information (*col.5, ln.13-14 where a memory is required to save the information to identify traffic flow*);
- a packet flow tracker (*flow management processor 122 fig.2*) interfaced with the enqueue engine and operable to track packet flows (*col.7, ln.2-3*) with the sequencing information; and
- a dequeue engine (*memory 106 fig.2*) interfaced with the packet flow tracker and the content engine, the dequeue engine forwarding packets to the content engine (*from 104 to 110 fig.2*) according to stream identification information received from the packet flow tracker (*col.5, ln.13-14 where ...a unique session id created by header preprocessor*)."

Regarding claim 3, Mahler further discloses, "the enqueue engine is further operable to determine that a packet is out of order for that packet's flow (*col.4, ln.54-56*) and to transmit the out-of-order packet to have any missing packets resent (*transmit missing or odd packets to processor 124 fig.2 for further processing as described in col.7, ln.4-5*)."

Regarding claim 4, Mahler further discloses, "the dequeue engine forwards the next packet of the flow (*col.7, ln.58-65 where the content processor receives the next packet from the dequeue engine because it can process one packet or traffic flow with session id*) for the stream identification information received from the packet flow tracker."

Regarding claim 5, Mahler further discloses, "the dequeue engine determines that no packets for the packet flow are ready and determines a second packet flow to send to the content engine (*col.7, ln.58-65 where the content processor receives the next packet from the dequeue engine because it can process one packet or traffic flow with session id*)."

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 8-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahler in view of Fritchman (U.S. 6,785,677, "Fritchman").

Regarding claim 6, Mahler lacks what Fritchman discloses, "the content engine comprises: a non-deterministic finite automata engine (*col.1, ln.54-57*) operable to search packet content for one or more regular expressions; and one or more hash engines (*col.2, ln.54-65*) operable to search packet content for one or more subexpressions."

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to include the non-deterministic finite automata (NFA) engine and the hash engine to the content engine taught by Mahler. The motivation of including the NFA is to read a string of symbols from its regular language such like alphabet. The motivation of including the hash engine is designed to efficiently store

non-contiguous key (account number, part number, etc.) that may wide gaps in their alphabet and numeric sequences.

Regarding claims 8, 16 and 24, Mahler further discloses, "the non-deterministic finite automata engine comprises field programmable gate arrays (FPGA) (*col.11, ln.38-39 where the fast pattern processor uses FPGA, which is a programmable processor*)."

Regarding claim 9, Mahler further discloses, "a state store module interfaced with the non-deterministic finite engine and operable to save the state of the non-deterministic finite automata engine associated with a packet flow so that the saved state is available for the search of the next packet of the packet flow." The detailed procedure for dealing with the state information such as storing, updating and searching for the next packets associating with the particular traffic flow is described in column 8:65-column 9:15.

Regarding claim 10, Mahler further discloses, "the content engine further comprising a tag map interfaced with the content engine to map the packet to a tag based on the content search (*116 in figure 2; col. 6, lines 3-18 where it is required to tag packets to assign to one of its quality of service queues; As an example, the method of tagging packets for virus infected data is described in col. 10, lines 43-63*)."

Regarding claim 11, it is a claim corresponding to claims 1 and 6 and is therefore rejected for the similar reasons set forth in the rejection of claims 1 and 6.

Regarding claim 12, Mahler further discloses, "the packet flow comprises a TCP stream (*IP network 10 fig.1 where TCP protocol is used in the IP network*)."

Regarding claim 13, it is a claim corresponding to claims 2-5 and is therefore rejected for the similar reasons set forth in the rejection of claims 2-5.

Regarding claim 14, it is claim corresponding to claim 6 and is therefore rejected for the similar reasons set forth in the rejection of claim 6.

Regarding claim 15, Mahler lacks what Fritchman discloses, "computing a hash for a subexpression of a regular expression match; and finding a subexpression match if the computed hash matches a hash in a hash look-up table (*col.2, ln.54-65*)."

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to include the function of computing a hash taught by Fritchman into the content engine of Mahler in order to have a fast string searching tool for classifying packets.

Regarding claim 17, it is a claim about the procedure of dealing with state information corresponding to claim 9 and is therefore rejected for the similar reasons set forth in the rejection of claim 9.

Regarding claim 22, it is a claim corresponding to claims 1, 6 and 7 and is therefore rejected for the similar reasons set forth in the rejection of claims 1, 6 and 7.

Regarding claim 23, Mahler further discloses the hash look-up table comprising bit engine that indexes the hash according to the position of bits in col.8, lines 27-38.

Regarding claims 25-28, they are claims about the procedure of dealing with state information. The detailed procedure for dealing with the state information such as storing, updating and searching for the next packets associating with the particular traffic flow is described in column 8:65-column 9:15.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahler in view of Fritchman and further in view of Imai et al. (U.S. 6,367,076, "Imai").

Regarding claim 7, Mahler and Fritchman are silent on the content engine further comprising a lexical analyzer interfaced with the non-deterministic finite automata engine and the hash engine, the lexical analyzer determining characters of the packets. However, Imai teaches the lexical analyzer determining characters of the packets (*lexical analyzer 31 fig.1; col.6, ln.53-54*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to include a lexical analyzer taught by Imai into the content engine disclosed by Mahler-Fritchman for the process of taking an input string of character and producing a sequence of symbols called lexical tokens in the content processor. The motivation of including the lexical analyzer is to read through the input one character at a time, changing states based on what character it encounters.

Allowable Subject Matter

6. Claims 18, 20, and 21 are allowed.

7. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. The applicant's arguments filed on March 01, 2006 have been fully considered, but they are not persuasive.

Rejection under 35 U.S.C. §102

At page 8, for the amended claim 1, applicant argues Mahler does not disclose "the use of a tag map to perform mappings between expressions and subexpressions to generate modified tags." In reply, Mahler teaches that a signature memory determines whether there is a potential match between the significant bits (subexpressions) of the context and the known strings (expression) as described in col.8, lines 27-38. The conclusion reached by signature memory needs to be tagged. For example, the method of tagging packets for virus infected data is described in col.10, ln.43-63. Therefore, the examiner respectfully disagrees.

At pages 8-9, applicant's arguments with respect to the amended independent claim 18 have been fully considered and are persuasive. The rejection of claim 18 has been withdrawn.

Rejection under 35 U.S.C. §103

At page 11, for the amended claim 11, applicant argues that Mahler and Fritchman do not disclose "a tag map used to perform a mapping between regular

Art Unit: 2616

expressions and subexpressions and is further used to generate a modified tag corresponding to match between predetermined expressions and subexpressions." In reply, this is a claim corresponding to claims 1 and 6 and is rejected for the similar reasons set forth described in the reply above for claim 1. Therefore, the examiner respectfully disagrees.

At page 11, for the amended claim 22, applicant argues that Mahler and Fritchman do not disclose "a tag map used to perform a mapping between regular expressions and subexpressions and is further used to generate a modified tag corresponding to match between predetermined expressions and subexpressions." In reply, this is a claim corresponding to claims 1, 6, and 7 and is rejected for the similar reasons set forth described in the reply above for claim 1. Therefore, the examiner respectfully disagrees.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

Art Unit: 2616

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

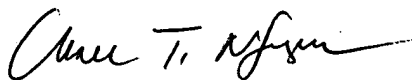
Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung Park whose telephone number is 571-272-8565. The examiner can normally be reached on Mon-Fri during 7:10-4:40.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau Nguyen can be reached on 571-272-3126. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JP
Jung Park
Patent Examiner
Art Unit 2661
April 13, 2006


CHAU NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600